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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/724,713

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Yoshihiro Ikoma

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McDERMOTT, WILL & EMERY  
600 13th Street, N.W.  
Washington, DC 20005-3096

EXAMINER

CHUO, TONY SHENG HSIANG

ART UNIT

PAPER NUMBER

1745

MAIL DATE

DELIVERY MODE

05/03/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/724,713	<b>Applicant(s)</b> IKOMA, YOSHIHIRO	
	<b>Examiner</b> Tony Chuo	<b>Art Unit</b> 1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 15 February 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Amendment***

1. Claims 1-16 are currently pending. The amended claims do overcome the previously stated 102 and 103 rejections. However, upon further consideration, claims 1-16 are rejected under the following new 102 and 103 rejections. This action is made FINAL as necessitated by the amendment.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1 and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Hards et al (US 5501915). The Hards reference discloses a cathode for a fuel cell comprising: a catalyst layer coated on a carbon cloth (gas diffusion layer), wherein the catalyst layer comprises a mixture of Pt supported on Vulcan XC72R (hydrophilic carbon), Nafion (ion exchange resin), and Shawinigan acetylene black (hydrophobic carbon), and wherein the mixture comprises 60wt% (Pt supported on Vulcan XC72R & Nafion) and 28wt% Shawinigan acetylene black (See Example 1 and 2). It also discloses a fuel cell comprising: an anode and a cathode on each side of a proton conducting polymer membrane (See column 9, lines 10-19).

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 2-4 and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hards et al (US 5501915) in view of Terazono et al (US 2002/0009626). The Hards reference is applied to claim 1 for reasons stated above. However, Hards et al does not expressly teach an average value of lattice spacing of the [002] plane,  $L_c(002)$ , of the second carbon particle that is between 0.337nm and 0.348nm and a crystallite size in a direction of c-axis,  $L_c(002)$ , of the second carbon particle that is between 3nm and 18nm. The Terazono reference discloses a graphitized carbon support for a catalyst layer that has an average lattice spacing of  $d_{002}$  of 0.341 and a crystallite size  $L_c$  of 3.5 nm (See paragraph [0008],[0048]). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use graphitized carbon particles having the above cited properties as the hydrophobic carbon black particles in the Hards cathode electrode in order to have adequate water repellency and the degree of water repellency in the gas diffusion electrode can be controlled by the degree of graphitization of the carbon black particles (See paragraphs [0013],[0016],[0075]).

6. Claims 5 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hards et al (US 5501915) in view of Koschany et al (US 6451470). The Hards reference is applied to claim 1 for reasons stated above. However, Hards et al does not

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expressly disclose a gas diffusion layer that also includes the first hydrophilic carbon particle and the second hydrophobic carbon particle. The Koschany reference discloses a gas diffusion layer comprising a first carbon fiber material that is filled with a second carbon material that has a hydrophobic surface (See column 4, lines 16-32). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Hards cathode electrode to include a gas diffusion layer that also includes the first hydrophilic carbon particle and the second hydrophobic carbon particle in order to maintain a high effective diffusion constant for reaction gases and a low effective diffusion constant for water so that water content is balanced in the electrode.

7. Claims 6-8 and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hards et al (US 5501915) in view of Terazono et al (US 2002/0009626) as applied to claims 2-4 above, and further in view of Koschany et al (US 6451470). However, Hards et al as modified by Terazono et al does not expressly disclose a gas diffusion layer that also includes the first hydrophilic carbon particle and the second hydrophobic carbon particle. The Koschany reference discloses a gas diffusion layer comprising a first carbon fiber material that is filled with a second carbon material that has a hydrophobic surface (See column 4, lines 16-32). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Hards/ Terazono cathode electrode to include a gas diffusion layer that also includes the first hydrophilic carbon particle and the second hydrophobic carbon particle in order to maintain a high effective diffusion constant for reaction gases and a low effective diffusion constant for water so that water content is balanced in the electrode.

***Response to Arguments***

8. Applicant's arguments with respect to claims 1-16 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tony Chuo whose telephone number is (571) 272-0717. The examiner can normally be reached on M-F, 8:30AM to 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TC

  
JONATHAN CREPEAU  
PRIMARY EXAMINER